

WE CLAIM:

1. A feed ration comprising:
a corn meal obtained after extraction of oil from whole high oil corn; and
at least one other nutrient.
2. The feed ration of claim 1, wherein the corn meal is obtained after solvent extraction.
3. The feed ration of claim 2, wherein the corn meal has been desolventized after extraction.
4. The feed ration of claim 2, wherein the whole high oil corn has been flaked prior to extraction to form flaked corn.
5. The feed ration of claim 4, wherein the flaked corn has been conditioned prior to flaking.
6. The feed ration of claim 1, wherein the at least one other nutrient is selected from the group consisting of meat and bone meal, feather meal, vitamin, mineral, fat, salt, oilseed meal, amino acid, oilseed meal, corn, sorghum, wheat byproduct, wheat milled byproduct, barley, tapioca, corn gluten meal, corn gluten feed, bakery byproducts, full fat rice bran, and rice hulls.
7. The feed ration of claim 6, wherein the feed ration further comprises at least an additional two other nutrients present in the amounts indicated below:

<u>Ingredient</u>	<u>Inclusion Range</u>
Extracted corn meal	2 – 95%
Oilseed Meal	3 – 35%
Meat and Bone Meal	0 – 12%
Feather Meal	0 – 6%
Fat	0 – 10%
Salt	0.1 – 0.5%
Lysine	0 – 0.4%
Methionine	0 – 0.3%
Nutrient Premix	0.01 – 1.0%

8. The feed ration of claim 1, wherein the feed ration is a swine feed.

9. The feed ration of claim 8, wherein the feed ration comprises:
extracted corn meal; and
one or more ingredients selected from the group consisting of meat and bone meal,
feather meal, vitamin, mineral, fat, salt, oilseed meal, amino acid, oilseed meal,
corn, sorghum, wheat byproduct, wheat milled byproduct, barley, tapioca, corn
gluten meal, corn gluten feed, bakery byproducts, full fat rice bran, and rice hulls.
10. The feed ration of claim 1, wherein the feed ration is a poultry feed.
11. The feed ration of claim 10, wherein the feed ration comprises:
extracted corn meal; and
one or more ingredients selected from the group consisting of meat and bone meal,
feather meal, vitamin, mineral, fat, salt, oilseed meal, amino acid, oilseed meal,
corn, sorghum, wheat byproduct, wheat milled byproduct, barley, tapioca, corn
gluten meal, corn gluten feed, bakery byproducts, full fat rice bran, and rice hulls.
12. The feed ration of claim 1, wherein the feed ration is a poultry layer feed.
13. The feed ration of claim 12, wherein the feed ration comprises:
extracted corn meal; and
one or more ingredients selected from the group consisting of meat and bone meal,
feather meal, vitamin, mineral, fat, salt, oilseed meal, amino acid, oilseed meal,
corn, sorghum, wheat byproduct, wheat milled byproduct, barley, tapioca, corn
gluten meal, corn gluten feed, bakery byproducts, full fat rice bran, and rice hulls.
14. The feed ration of claim 1, wherein the feed ration is a cattle feed, equine feed,
aquaculture feed, or pet food.
15. The feed ration of claim 14, wherein the feed ration comprises:
extracted corn meal; and
one or more ingredients selected from the group consisting of meat and bone meal,
feather meal, vitamin, mineral, fat, salt, oilseed meal, amino acid, oilseed meal,
corn, sorghum, wheat byproduct, wheat milled byproduct, barley, tapioca, corn
gluten meal, corn gluten feed, bakery byproducts, full fat rice bran, and rice hulls.

Component	Amount (%)
Moisture	5-25
Oil	0.75-6
Protein	7-20
Starch	40-80
Fiber	2-4
Ash	0.5-2.0

Component	Amount (%)
Moisture	5-45
Oil	0.75-12
Protein	8-20
Starch	40-70
Lysine	0.2-2.0
Tryptophan	0.03-2.0

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19. A human food product comprising an extracted corn meal obtained after extraction of oil from whole kernels of high oil corn.

20. The human food product of claim 19, wherein the corn meal is obtained after solvent extraction.

21. The human food product of claim 20, wherein the corn meal has been desolventized after extraction.

22. The human food product of claim 21, wherein the whole kernels have been flaked prior to extraction to form flaked corn.

23. The human food product of claim 22, wherein the flaked corn has been conditioned prior to flaking.

24. The human food product of claim 23, wherein the corn meal comprises at least the following components present in the amount indicated:

Component	Amount (%)
Moisture	5-25
Oil	0.75-6
Protein	7-20
Starch	40-80
Fiber	2-4
Ash	0.5-2.0

25. The human food product of claim 23, wherein the human food product is selected from the group consisting of puffed snack food, cereal, chips, bread, blended food, extruded snack food, food binding agent, food supplement, nutritional food bar, multi-vitamin supplement, and porridge.

26. A corn oil-containing product comprising:
corn oil obtained from high oil corn by extraction of the entire kernel of the high oil corn.
27. The corn oil-containing product of claim 26, wherein the corn oil comprises:
oil extracted from at least the germ and endosperm of the high oil corn; and
at least one other component extracted from one or more of the endosperm, tipcap or pericarp of the high oil corn.
28. The corn oil-containing product of claim 26, wherein the corn oil comprises:
oil extracted from the germ and the endosperm of the high oil corn; and
at least one component extracted from one or more of the endosperm, tipcap or pericarp of the high oil corn, wherein the component is selected from the group consisting of a carotene, xanthophyll, lutein, pigment, tocotrienol, tocopherol, antioxidant, fat soluble vitamin, sterol, and zeaxanthin.
29. The corn oil-containing product of claim 26 further comprising one or more materials selected from the group consisting of conventional corn oil, soy oil, canola oil, olive oil, palm oil, sunflower oil, safflower oil, antioxidant, flavoring, hydrogenated oil, partially hydrogenated oil, and animal fat.
30. The corn oil-containing product of claim 29, wherein the product is selected from the group consisting of food oil, cooking oil, edible oil, and blended oil.
31. The corn oil-containing product of claim 30, wherein the product is cooking oil.
32. The corn oil-containing product of claim 26, wherein prior to extraction the high oil corn contains at least about 8.0% of oil based upon the weight of a corn kernel.
33. The corn oil-containing product of claim 26, wherein the extraction is selected from the group consisting of solvent-based extraction, hydraulic pressing, expeller pressing, aqueous extraction and enzyme extraction.
34. The corn oil-containing product of any one of claims 26-33, wherein the oil-based product is selected from the group consisting of a food supplement, sport drink, cereal, multi-vitamin supplement, nutritional food bar, and diet drink.
35. The corn oil-containing product of claim 26 further comprising one or more other components selected from the group consisting of food additive, salt, fat, food color, β -carotene, annatto extract, curcumin or tumeric, β -apo-8'-carotenal, β -apo-8'-carotenal

36. A method of using extracted corn meal in an animal feed ration comprising the steps of:

providing an extracted corn meal prepared by at least flaking high oil corn to form flaked corn and extracting the flaked corn to remove a portion of the corn oil therefrom; and

including the extracted corn meal in an animal feed ration.

37. The method of claim 36, wherein the high oil corn has been conditioned prior to flaking to form a conditioned high oil corn.

38. The method of claim 37, wherein the conditioned high oil corn has been cracked prior to conditioning.

39. The method of claim 36, wherein a major portion of the oil originally present in the high oil corn is removed by extraction.

40. The method of claim 36, wherein at least 10% weight of the oil originally present in the high oil corn is removed by extraction.

41. The method of claim 36, wherein the extracted corn meal comprises:

about 0.75-12.0% wt. of fat;

about 5-45% wt. of moisture;

about 7- 20% wt. of protein;

about 2-4% wt. of crude fiber; and

about 40-80% wt. of carbohydrate.

42. The method of claim 41, wherein the majority of the animal feed ration is the extracted corn meal.

43. The method of claim 41 further comprising the step of:

adding to the extracted corn meal at least one other component selected from the group consisting of grain, flavorant, preservative, oil, oilseed meal, meat & bone meal, protein, fiber, feather meal, fat, salt, amino acid, vitamin and mineral to form the animal feed ration.

44. The method of claim 43 further comprising the step of:

providing the animal feed ration as a finishing feed ration for at least one of swine, layer poultry and broiler poultry.

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45. A method of using an extracted corn oil in a food product comprising the steps of: providing an extracted corn oil obtained by at least flaking high oil corn to form flaked corn and extracting the flaked corn to remove a portion of the corn oil therefrom and form the extracted corn oil; and including the extracted corn oil in a food product.
46. The method of claim 45, wherein the high oil corn has been conditioned prior to flaking to form a conditioned high oil corn.
47. The method of claim 46, wherein the high oil corn has been cracked prior to conditioning.
48. The method of claim 45, wherein a major portion of the oil originally present in the high oil corn is removed by extraction.
49. The method of claim 45, wherein at least 10% weight of the oil originally present in the high oil corn is removed by extraction.
50. The method of claim 46, wherein the extracted corn oil comprises at least about twice the amount of tocotrienol present in conventional corn oil obtained from conventional corn by conventional dry milling or wet milling methods.
51. The method of claim 46, wherein the extracted corn oil comprises at least about twice the amount of beta carotene, lutein, zeaxanthin, or other pigments present in conventional corn oil obtained from conventional corn by conventional dry milling or wet milling methods.
52. The method of claim 50 or 51 further comprising the step of: adding to the extracted corn oil at least one other component selected from the group consisting of conventional corn oil, soy oil, canola oil, olive oil, palm oil, sunflower oil, safflower oil, antioxidant, flavoring, hydrogenated oil, partially hydrogenated oil, animal fat, vinegar, salt, water, flour, spices, potato, and sugar.
53. The method of claim 52 further comprising the step of: providing the food product in a form suitable for human or animal consumption.

54. A method of using extracted corn oil as a feedstock in the oil refining process, the method comprising the steps of:

providing an extracted crude corn oil obtained by at least flaking high oil corn to form flaked corn and extracting the flaked corn to remove a portion of the corn oil therefrom and form the extracted crude corn oil; and

including the extracted crude corn oil in a raw material stream of an oil refining process.

55. The method of claim 54 further comprising the step of:

refining the extracted crude corn oil to form a purified corn oil.

56. The method of claim 55, wherein the oil has been removed from the flaked corn by solvent extraction.

57. The method of claim 56, wherein the step of refining comprises the step of: bleaching or deodorizing the corn oil to form a purified corn oil.

58. The method of claim 56, wherein the step of refining comprises the steps of:

mixing the crude oil with a caustic solution for a sufficient period of time to form a mixture; and

centrifuging the mixture to separate a refined oil from free fatty acids.

59. A method of forming an extracted blended meal comprising an extracted meal obtained from high oil corn and one or more other oilseed meals, the method comprising the steps of:

combining high oil corn grain and one or more other oilseed grains to form a grain mixture; and

subjecting the grain mixture to flaking and an extraction process to remove oil therefrom and form the extracted blended meal.

60. A method of forming an extracted blended meal comprising an extracted meal obtained from high oil corn and one or more other oilseed meals, the method comprising the steps of:

combining a cracked and conditioned high oil corn with a cracked and conditioned other oilseed to form a conditioned mixture;

flaking the conditioned mixture to form a flaked mixture; and

subjecting the flaked mixture to an extraction process to remove oil therefrom and form the extracted blended meal.

61. A method of forming an extracted blended meal comprising an extracted meal obtained from high oil corn and one or more other oilseed meals, the method comprising the steps of:

combining a cracked, conditioned and flaked high oil corn with a cracked, conditioned and flaked other oilseed to form a flaked mixture; and

subjecting the flaked mixture to an extraction process to remove oil therefrom and form the extracted blended meal.

62. A method of forming an extracted blended meal comprising an extracted meal obtained from high oil corn and one or more extracted other oilseed meals, the method comprising the step of:

combining an extracted corn meal with one or more extracted other oilseed meals to form a blended meal, wherein the extracted corn meal has been obtained by at least flaking and extracting high oil corn to form the extracted corn meal.

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63. A method according to any one of claims 59, 60, 61 or 62 further comprising the step of:

adding additional components to the extracted blended meal to form an extracted blended meal product.

64. An extracted blended meal product prepared according to the method of claim 63.

65. A method according to any one of claims 59, 60, 61 or 62 wherein the extracted corn meal comprises:

about 0.75-12.0% wt. of fat;

about 5-45% wt. of moisture;

about 7- 20% wt. of protein;

about 2-4% wt. of crude fiber; and

about 40-80% wt. of carbohydrate.

66. An extracted blended meal prepared according to claim 65.

67. A method according to any one of claim 59, 60, 61 or 62 wherein the one or more other oilseed is selected from the group consisting of soybean, canola seed, sunflower seed, oilseed rape, and cotton seed.

68. A blended meal product prepared according to any one of claims 59, 60, 61 or 62 wherein the blended meal product comprises:

about 0.75-12.0% wt. of fat;

about 5-45% wt. of moisture;

about 5-60% wt. of protein;

about 2-4% wt. of crude fiber; and

about 40-80% wt. of carbohydrate.

69. A method of forming an extracted blended meal comprising the steps of:

forming a mixture comprising corn germ and whole high oil corn; and

extracting the mixture to form the extracted blended meal.

70. An extracted blended meal prepared according to claim 69.

71. An extracted blended meal according to any one of claims 59, 60, 61, 62 or 70, wherein the extracted blended meal is pelleted.

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~~75. Use of a corn oil in an animal feed or human food, wherein the corn oil is obtained by extraction from whole kernels of high oil corn.~~

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